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09/960,405	09/24/2001	Toru Katagiri	837.1971	5622

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/960,405	Applicant(s) KATAGIRI ET AL.	
	Examiner Christina Y. Leung	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,5,9-19 and 30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,5,9-19 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1, 4, 5, 10-19, and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Onaka et al.** (JP 11-289296 A; see English-language equivalent document US 6,351,323 B1) in view of **Suzuki** (US 4,945,531 A) and **Kersey et al.** (US 6,594,410 B2)..

Examiner notes that because JP 11-289296 A is in Japanese, all references below to its disclosure are made to its English-language equivalent document, US 6,351,323 B1.

Regarding **claims 1, 4, 5, 15, and 30**, Onaka et al. disclose an optical node device (Figure 2) applicable to an optical network including a closed loop provided by an optical fiber, comprising:

a tunable wavelength selecting element (acousto-optic tunable filter AOTF 10) adapted to input WDM signal light obtained by wavelength division multiplexing a plurality of optical signals having different wavelengths, the tunable wavelength selecting element having a function of dropping at least one optical signal from the WDM signal light and a function of adding at least one optical signal to at least one unassigned wavelength channel of the WDM signal light (column 7, lines 51-67; column 8, lines 1-39).

Further regarding claims 15 and 30 in particular, Onaka et al. further disclose a system comprising:

a closed loop provided by an optical fiber; and

a plurality of optical node devices arranged along the closed loop, the plurality of optical node devices including a first optical node and a second optical node device (Figures 10 and 45; column 18, lines 1-17);

wherein the first and second optical node devices each include a tunable wavelength selecting element as discussed above.

Regarding claims 1, 4, 5, 15, and 30, Onaka et al. do not specifically disclose a wavelength selecting filter for removing noise present in bands other than a signal band of each optical signal and comprising a demultiplexer and multiplexer connected together and including other details as specifically recited by claims 1, 15, and 30. However, Onaka et al. do disclose that the signals in their system may include undesirable amplified spontaneous emission (ASE) noise (column 8, lines 53-58).

Suzuki further teaches a system related to the one disclosed by Onaka et al. including wavelength multiplexed optical signals and further teaches a means for filtering ASE noise comprising a wavelength selecting filter (optical filter 100 shown in Figure 1), the filter comprising:

an optical demultiplexer 101 having an input port for inputting WDM signal light output and N output ports for respectively outputting the N optical signals separated from the WDM signal light; and

an optical multiplexer 102 having N input ports for respectively inputting N optical signals output from the demultiplexer, and an output port for outputting WDM signal light

obtained by wavelength division multiplexing the N optical signals input to the N input ports (column 2, lines 47-56);

wherein the transmission band of each of the optical demultiplexer and the optical multiplexer per wavelength channel is wider than the band of each wavelength channel of the WDM signal light (Figures 2A-C; column 3, lines 7-23).

Examiner respectfully notes that Figure 2B of Suzuki shows the transmission bands per wavelength channel of the optical demultiplexer and multiplexer. They are wider than the corresponding bands of each wavelength channel of the WDM signal light (Figures 2A and 2C shows the bands of the signal light as narrow lines; Figure 2C in particular shows how the bands of the demultiplexer and multiplexer are wide enough to pass the narrower bands of the signal light plus a small amount of noise to either side of the signal light).

Further regarding claim 4 in particular, in the wavelength selecting filter taught by Suzuki, the input ports of the optical multiplexer are optically connected to the output ports of the optical demultiplexer, respectively (Figure 1).

Further regarding claim 5 in particular, in the wavelength selecting filter taught by Suzuki, the input port and the i-th output port of the optical demultiplexer are coupled by the transmission band of the optical demultiplexer including the wavelength of any one of the wavelength channels of the WDM signal light in the system; and the j-th input port and the output of the optical multiplexer are coupled by the transmission band of the multiplexer including the wavelength of any one of the wavelength channels of the WDM signal light in the system (Figures 1 and 2A-C).

Regarding **claims 1, 4, 5, 15, and 30**, it would have been obvious to a person of ordinary skill in the art to additionally include a wavelength selecting filter as taught by Suzuki in the system disclosed by Onaka et al. (wherein the demultiplexer and multiplexer of the filter is connected to the elements disclosed by Onaka et al. and arranged on the closed loop) in order to remove ASE noise from the WDM signal light in the system and thereby more effectively transmit desired signals in the system. One in the art would have been particularly motivated to combine the filter taught by Suzuki with the system disclosed by Onaka et al. because Onaka et al. already discloses that the signals in their system may include undesirable amplified spontaneous emission (ASE) noise (Onaka et al., column 8, lines 53-58).

Further regarding claims 1, 4, 5, 15, and 30, Suzuki does not specifically further teach that the transmission band per wavelength channel of the optical demultiplexer is different from the transmission band per wavelength channel of the optical multiplexer or that either transmission band per wavelength channel has a central wavelength longer or shorter than the central wavelength of each wavelength channel of the WDM signal light.

However, Kersey et al. teach a system related to the one described by Onaka et al. in view of Suzuki, including transmitting and filtering wavelength division multiplexed optical signals. Kersey et al. further teaches filtering an optical WDM signal through one filter and then another filter, wherein the transmission band (labeled "47'" in Figure 11) of the first filter has a central wavelength λ_A substantially coinciding with a first wavelength shorter than the central wavelength λ_C of the desired wavelength channel of the WDM signal; and

the transmission band 48' of the second filter has a central wavelength λ_B substantially coinciding with a second wavelength longer than the central wavelength λ_C of the desired wavelength channel of the WDM signal (Figure 11; column 16, lines 7-34).

Regarding **claims 1, 4, 5, 15, and 30**, it would have been obvious to a person of ordinary skill in the art to provide a first central wavelength shorter than the central wavelength of the desired channel and a second central wavelength longer than the central wavelength of the desired channel as taught by Kersey et al. in the demultiplexer/multiplexer filter structure taught by Suzuki (in the system suggested by Onaka et al. in view of Suzuki) in order to advantageously provide a narrower filter band and therefore filter the desired channels more precisely.

Regarding **claim 10**, Onaka et al. disclose that the tunable wavelength selecting element comprises an acousto-optic tunable filter (AOTF 10 as shown in Figure 2; column 7, lines 51-67).

Regarding **claims 11 and 17**, Onaka et al. disclose the tunable wavelength selecting element (AOTF 10 shown in Figure 2) has a first input port ("INPUT") for inputting the WDM signal light, a second input port ("ADD") for inputting an optical signal to be added to the WDM signal light, a first output port ("OUTPUT") for outputting an optical signal to be passed through the tunable wavelength selecting element, and a second output port ("DROP") for outputting an optical signal to be dropped from the WDM signal light.

Regarding **claims 12 and 18**, Onaka et al. further disclose that the node device (Figure 2) further comprises:

an optical coupler 12 having a plurality of input ports and an output port connected to the second input port of the tunable wavelength selecting element 10;

an optical modulator 16 connected to each of the plurality of input ports of the optical coupler; and

a tunable light source (including laser diodes 19 in combination with tunable filters 14) connected to the optical modulator (column 8, lines 20-39).

Regarding **claims 13 and 19**, Onaka et al. further disclose that the node device (Figure 2) further comprises:

an optical coupler 11 having an input port connected to the second output port of the tunable wavelength selecting element 10, and a plurality of output ports;

a tunable filter 13 connected to each of the plurality of output ports of the optical coupler; and

an optical receiver 17 connected to the tunable filter (column 7, lines 64-67; column 8, lines 1-9).

Regarding **claims 14 and 16**, Onaka et al. further disclose an optical amplifier (such as amplifiers 30 or 34 on the transmission line as generally shown in Figure 3, or other optical amplifiers shown in other figures including Figure 10, etc.; column 8, lines 66-67; column 9, lines 1-41).

3. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Onaka et al.** in view of **Suzuki** and **Kersey et al.** as applied to claim 4 above, and further in view of **Otsuka et al.** (JP 11-218790 A; see English-language equivalent document US 6,538,782 B1).

Examiner notes that because JP 11-218790 A is in Japanese, all references below to its disclosure are made to its English-language equivalent document, US 6,538,782 B1.

Regarding claim 9, Onaka et al. in view of Suzuki and Kersey et al. describe a system as discussed above with regard to claims 1 and 4 including an optical demultiplexer and multiplexer, but they do not specifically suggest that the demultiplexer and multiplexer are arrayed waveguide gratings.

However, it is well known in the art that wavelength demultiplexers and multiplexers such as in the system described by Onaka et al. in view of Suzuki and Kersey et al. may be implemented in several ways, and Otsuka et al. specifically teach implementing demultiplexers and multiplexers as arrayed waveguide gratings (column 1, lines 59-67; column 2, lines 1-15).

Regarding claim 9, it would have been obvious to a person of ordinary skill in the art to use arrayed waveguide gratings as taught by Otsuka et al. in the system described by Onaka et al. in view of Suzuki and Kersey et al. as an engineering design choice of a known way to implement the demultiplexer and multiplexer already disclosed. The claimed differences exist not as a result of an attempt by Applicants to solve an unknown problem but merely amount to the selection of expedients known as design choices to one of ordinary skill in the art.

Response to Arguments

4. Applicant's arguments filed 04 May 2007 have been fully considered but they are not persuasive.

Examiner respectfully disagrees with Applicant's assertion on pages 8 and 9 of the response that "the optical filter Suzuki does not remove noise in any bands other than a signal band of each optical signal" and that "Suzuki adds nothing of relevance to the combination of references." On the contrary, Suzuki clearly teaches that the optical filter 100, comprising demultiplexer 101 and multiplexer 102, removes noise in bands that are between (i.e., "other

than") signal bands of each optical signal. Figure 2A, for example, shows a before-filtering state wherein the spectrum includes signal bands (shown as narrow vertical lines on the spectrum) as well as noise in between the signal bands (shown as the diagonally striped portion). Figure 2C, shows an after-filtering state wherein noise in the bands between/other than the signal bands has been removed. See column 3, lines 7-23.

Examiner respectfully further disagrees with Applicant's assertion pages 8 and 9 of the response that Suzuki does not teach that the transmission band of each of the optical demultiplexer and the optical multiplexer per wavelength channel is wider than the band of each wavelength channel of the WDM signal light. On the contrary, Examiner respectfully notes that Figure 2B of Suzuki shows the transmission bands per wavelength channel of the optical demultiplexer and multiplexer. They are wider than the corresponding bands of each wavelength channel of the WDM signal light. Figures 2A and 2C shows the bands of the signal light as narrow lines; Figure 2C in particular shows how the bands of the demultiplexer and multiplexer are wide enough to pass the narrower bands of the signal light plus a small amount of noise to either side of the signal light. Again, see column 3, lines 7-23.

Regarding Applicant's arguments on pages 9 and 10 with respect to claim 30, Examiner notes that the rejection of claim 30 relies on Onaka et al. to provide a disclosure of a plurality of optical node devices each comprising a tunable wavelength selecting element. Suzuki is relied upon to provide a teaching of wavelength selecting filters (each comprising a demultiplexer and multiplexer) corresponding to the nodes already disclosed by Onaka et al. Kersey et al. is further relied upon for their teaching of how to improve the filtering characteristics of *each* wavelength selecting filter already taught by Suzuki.

Although Applicant asserts that combination of Onaka et al., Suzuki, and Kersey et al. do not suggest the combination recited in claim 30 because the filter functions 47 and 48 of Kersey are "provided in one node," Examiner notes that Kersey teaches improving the filtering characteristics between the corresponding demultiplexer and multiplexer in *each* wavelength filtering element taught by Suzuki. Again, Suzuki is relied upon to provide a teaching of a plurality of wavelength selecting filters (each comprising a demultiplexer and multiplexer) corresponding to the plurality of nodes already disclosed by Onaka et al.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 571-272-3023. The examiner can normally be reached on Monday to Friday, 7:30 to 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christina Y. Leung
CHRISTINA LEUNG
PRIMARY EXAMINER